APPLICATION REPORT

Minerals & Mining

Level measurement of sand in an aggregate quarry

- Automated stock management for end-user oriented product supply
- No silo overfill due to accurate level measurement of a low reflective product with non-flat surface
- Retrofit of an existing installation with 80 GHz radar level transmitter
- Flush-mounted radar prevents crusting of antenna by dusty and clogging medium

1. Background

EIE GUERRIER, a manufacturer of quarry equipment, supplies material to a French aggregate quarry. The quarry produces aggregates of different grain sizes, among others fine sand (0.4 mm / 0.02") for masonry works. The sand is stored in a silo before being transported to different construction sites.

Aggregate quarry

2. Measurement requirements

The quarry extracts stone which is crushed, screened and washed before being split between different storage places. A conveyor transports the sand into a conical storage silo (of 8 m / 26.3 ft height) with internal obstructions. The silo fills lorries that carry the product to construction sites.

In order to ensure a consistent availability of sand, the level of product inside the storage silo must be continuously monitored. Having used an OPTIWAVE 6300 radar level transmitter since 2009, the quarry operator wanted to modernize their process while benefitting from the advantages of the latest radar level technology.

Old OPTIWAVE 6300 radar with drop antenna

Installation situation on storage silo (red arrow)

KROHNE

3. KROHNE solution

KROHNE replaced the OPTIWAVE 6300 with DN80 / 3" PP Drop antenna by an OPTIWAVE 6500 radar level transmitter with DN40 / 1.5" PEEK Lens antenna and G 2½ process connection. Installed in an orientable bracket, this 80 GHz FMCW radar reliably measures the level of product through the roof hatch of the storage silo.

Designed for fine powders and dusty atmosphere it guarantees constant stock and smooth supply. Like the OPTIWAVE 6300 before, the OPTIWAVE 6500 transmits the measured values directly to the DCS in a control room.

Removal of old OPTIWAVE 6300 level transmitter

Retrofit with flush-mounted OPTIWAVE 6500 radar level transmitter

4. Customer benefits

The specific algorithms and high signal dynamics of this FMCW radar level transmitter are the key to reliable and accurate readings despite a series of issues related to the level measurement of fine powers (e.g. dust, low dielectrics, build-up, and uneven product surfaces). Thanks to the small beam angle of the PEEK Lens antenna, this powerful device handles high and narrow silos even in the presence of internal obstructions. In order to avoid crusting, the antenna is flush-mounted and has a smooth surface. The customer no longer needs to climb on the silo roof for periodic cleaning and undesirable interruptions of the production cycle can be avoided.

The quarry operator also benefits from an automated stock management allowing for end-user oriented product supply. As the measured values are provided to the control room, the operator is able to optimise his inventory supply without taking the risk of the silos overfilling. The installation wizard and PACTware™ make it easy to set up and being a 2-wire device, it also needs less wiring. This reduces the installation and operating costs. Adding the competitive price of the OPTIWAVE 6500 to these advantages, this solution gives a fast return on investment.

5. Product used

OPTIWAVE 6500 C

- 2-wire, loop-powered 80 GHz non-contact radar (FMCW) level transmitter for powders and dusty atmospheres
- High dynamics for clear vision despite dusty conditions or low-reflective media
- Flush-mounted PEEK Lens antenna (no tank intrusion)
- Small beam angle (4° DN70 / 2.75" Lens) for easy installation
- Unaffected by angle of repose – no need for antenna aiming kits
- Measuring distances up to 100 m / 328 ft
- 112 mm / 4.4" antenna extension for long nozzles
- Extensive choice of process connections
- Purging system for flange connection without antenna extension
- ±2 mm / ±0.08" accuracy
- PACTware™, HART® DDs and DTMs provided free of charge with full functionality

Contact

Would you like further information about these or other applications?
Do you require technical advice for your application?
application@krohne.com

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www.krohne.com